

[INSTITUTE NAME]

◆ INDUSTRY-READY CAREER PROGRAM

Data Science + Generative AI + Agentic AI

Complete End-to-End Training Program

■ Duration

6 Months

■ Mode

Online / Offline

■ Level

Beginner → Advanced

■ Cert

Industry Certificate

PYTHON

STATISTICS

ML

DEEP LEARNING

NLP

GENAI

AGENTIC AI

DEPLOYMENT

What You'll Learn

- Build complete Data Science projects from scratch
- Master Machine Learning & Deep Learning algorithms
- Work with Large Language Models & Prompt Engineering
- Create AI Agents with LangChain & AutoGPT frameworks
- Deploy real-world ML models using Flask, FastAPI & Streamlit
- Get job-ready with portfolio, resume & interview support

BASICS

- Variables & Data Types
- Operators & Expressions
- Input / Output

CONTROL FLOW

- if / elif / else
- for & while Loops
- break, continue, pass

FUNCTIONS & MODULES

- Defining Functions
- Args, *args, **kwargs
- Lambda Functions
- Importing Modules

FILE & EXCEPTION HANDLING

- File Read / Write
- try / except / finally
- Custom Exceptions

OOP CONCEPTS

- Classes & Objects
- Inheritance & Polymorphism
- Encapsulation & Abstraction

KEY LIBRARIES

- NumPy – Arrays & Math
- Pandas – DataFrames
- Data Handling Basics

LINEAR ALGEBRA

- Vectors & Matrices
- Matrix Operations
- Eigenvalues & Eigenvectors
- Dot Product & Norms

PROBABILITY

- Basic Probability Rules
- Conditional Probability
- Bayes' Theorem

DESCRIPTIVE STATISTICS

- Mean, Median, Mode
- Variance & Std Deviation

- Skewness & Kurtosis

INFERENCE STATISTICS

- Hypothesis Testing
- p-value & Significance
- Confidence Intervals

DISTRIBUTIONS

- Normal Distribution
- Binomial Distribution
- Poisson Distribution

RELATIONSHIPS

- Correlation & Covariance
- Regression Basics

DATA CLEANING

- Handling Missing Values
- Removing Duplicates
- Outlier Detection

DATA TRANSFORMATION

- Encoding Categorical Data
- Scaling & Normalization
- Binning & Discretization

EDA

- Univariate Analysis
- Bivariate & Multivariate
- Pattern Recognition

FEATURE ENGINEERING

- Feature Creation
- Feature Selection Methods
- Dimensionality Reduction (PCA)

VISUALIZATION

- Matplotlib – Plots & Charts
- Seaborn – Statistical Plots
- Plotly – Interactive Visuals

ADVANCED PANDAS

- GroupBy & Aggregation
- Merge, Join & Concat
- Time-Series Handling

SUPERVISED LEARNING

- Linear Regression
- Logistic Regression
- Decision Trees
- Random Forest

ALGORITHMS – BOOST

- Gradient Boosting
- XGBoost, LightGBM
- Support Vector Machines (SVM)

UNSUPERVISED LEARNING

- K-Means Clustering
- DBSCAN
- Hierarchical Clustering

DIMENSIONALITY REDUCTION

- PCA
- t-SNE
- Feature Importance

MODEL EVALUATION

- Confusion Matrix
- Precision, Recall, F1
- ROC-AUC Curve
- R^2 , MSE, RMSE

TUNING & VALIDATION

- Train / Val / Test Split
- Cross Validation (K-Fold)
- Hyperparameter Tuning

NEURAL NETWORK BASICS

- Perceptron & MLP
- Weights, Bias & Layers
- Activation Functions

TRAINING CONCEPTS

- Backpropagation
- Gradient Descent Variants
- Loss Functions
- Batch & Epochs

CNN – COMPUTER VISION

- Convolutional Layers
- Pooling & Flattening

- Image Classification Projects

RNN & SEQUENCES

- Recurrent Neural Networks
- LSTM & GRU
- Sequence Prediction

FRAMEWORKS

- TensorFlow & Keras
- PyTorch Basics

ADVANCED TOPICS

- Transfer Learning
- Dropout & Regularization
- Model Checkpointing

TEXT PREPROCESSING

- Tokenization
- Stopword Removal
- Stemming & Lemmatization

FEATURE REPRESENTATION

- Bag of Words (BoW)
- TF-IDF Vectorization
- N-Grams

WORD EMBEDDINGS

- Word2Vec
- GloVe Embeddings
- FastText

NLP TASKS

- Sentiment Analysis
- Named Entity Recognition
- Text Classification

ADVANCED NLP

- Transformers Architecture
- BERT & Variants
- Sequence-to-Sequence Models

TOOLS & LIBRARIES

- NLTK
- spaCy
- Hugging Face Basics

LLM FOUNDATIONS

- What are LLMs
- GPT Architecture
- Tokenization in LLMs

PROMPT ENGINEERING

- Zero-Shot Prompting
- Few-Shot Prompting
- Chain-of-Thought
- Prompt Templates

APIS & INTEGRATION

- OpenAI API Setup
- ChatGPT API Calls
- API Rate Limits & Costs

HUGGING FACE

- Model Hub Navigation
- Pipeline API
- Inference Endpoints

GENERATION TYPES

- Text Generation
- Code Generation
- Image Generation Basics (DALL-E)

FINE-TUNING

- When to Fine-Tune
- LoRA & PEFT Basics
- Dataset Preparation

AI AGENTS BASICS

- What are AI Agents
- Agent Loop Concept
- Types of Agents

LANGCHAIN FRAMEWORK

- LangChain Architecture
- Chains & Prompts
- Memory & Context

ADVANCED CONCEPTS

- AutoGPT Concepts
- ReAct Prompting
- Tool-Augmented Agents

MULTI-AGENT SYSTEMS

- Agent Orchestration
- CrewAI Basics
- Task Delegation

TOOL USAGE

- API Calling
- Database Querying
- Web Browsing Agents

MEMORY & AUTOMATION

- Short & Long-Term Memory
- Workflow Automation
- Real-World Agent Projects

DEVELOPMENT ENV

- Python Ecosystem Setup
- Jupyter Notebook / Lab
- VS Code for Data Science

VERSION CONTROL

- Git Fundamentals
- GitHub – Repos & PRs
- Branching Strategies

DATABASES

- SQL Basics
- Querying with Pandas
- SQLite & PostgreSQL Intro

BI & DASHBOARDS

- Power BI – Reports
- Tableau – Visualizations
- Dashboard Best Practices

CLOUD & DEVOPS

- Google Colab / Kaggle
- Docker Basics
- Cloud Overview (AWS/GCP)

MLOPS BASICS

- Experiment Tracking
- MLflow Intro
- Model Registry Concepts

END-TO-END PROJECTS

- Problem Scoping
- Data Collection
- Full ML Pipeline Build

WEB FRAMEWORKS

- Flask – REST APIs
- FastAPI – High Performance
- API Documentation (Swagger)

UI & DASHBOARDS

- Streamlit Apps
- Gradio Interfaces
- Interactive Demos

DEPLOYMENT

- Render / Railway Deploy
- Hugging Face Spaces
- Environment Variables & Secrets

REAL-TIME PROJECTS

- Prediction APIs
- Chatbot Deployment
- GenAI App Projects

PORTFOLIO BUILDING

- GitHub Portfolio Setup
- Project README Writing
- Demo Video Creation

RESUME & PROFILE

- ATS-Friendly Resume
- LinkedIn Optimization
- Profile Keyword Strategy

INTERVIEW PREP

- Mock Technical Interviews
- ML Concept Q&A
- Coding Challenge Practice

JOB SEARCH

- Job Portal Strategy
- Cold Outreach Templates
- Referral Network Building

INTERNSHIPS

- Internship Guidance
- Freelance Projects
- Kaggle Competitions

PLACEMENT SUPPORT

- Job Assistance
- Offer Negotiation Tips
- Alumni Network Access

MINDSET & GROWTH

- Personal Branding
- Continuous Learning Plan
- Community Participation